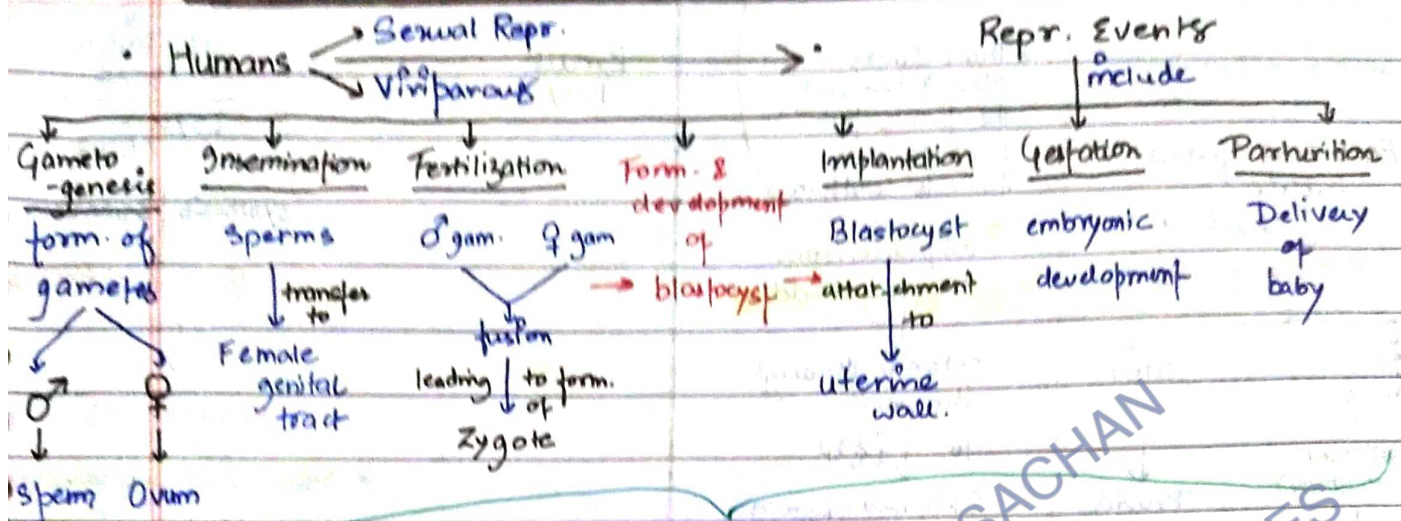


HUMAN REPRODUCTION



Remarkable difference in reproductive events of

If a dog gave birth to 6 puppies, means it gave birth to 6 eggs

Male: Sperm formation continues even in old men

Female: Formation of ovum ceases in women around age of 50 yrs.

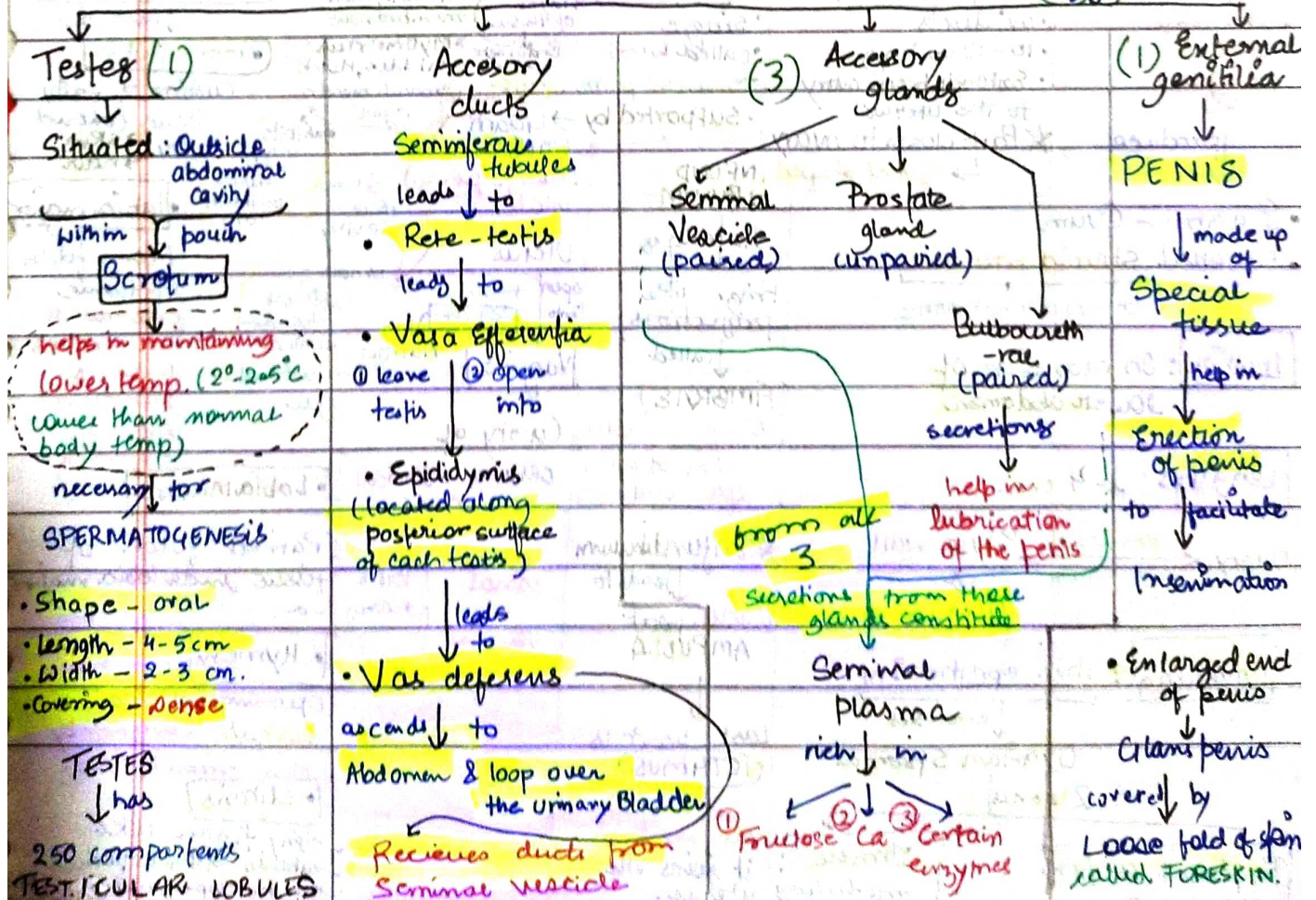
MALE REPRODUCTIVE SYSTEM

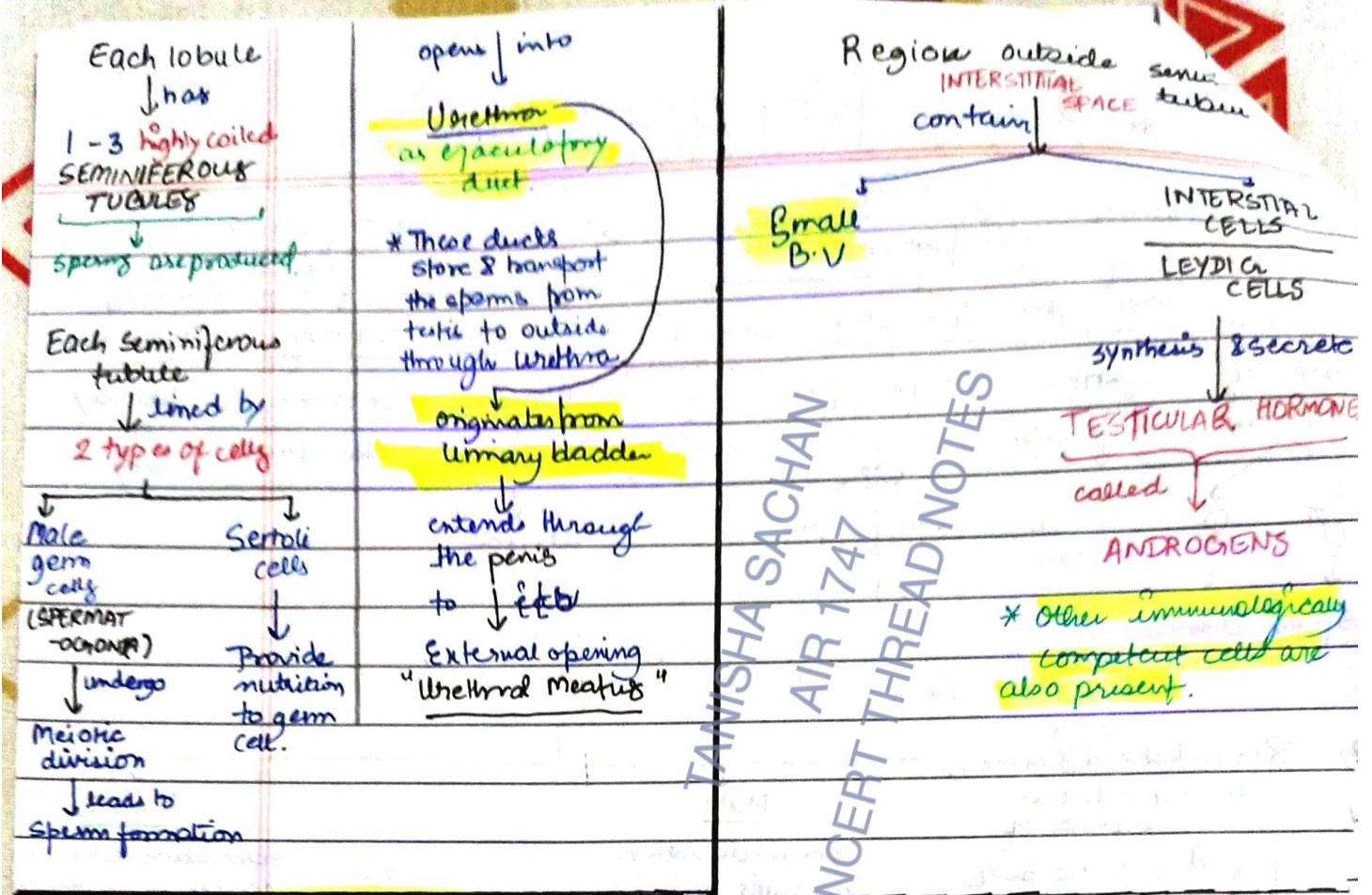
* Located in: Pelvis region

4 parts

Monozygotic twins - 1 egg

Dizygotic twins - non-identical (fraternal) 2 eggs



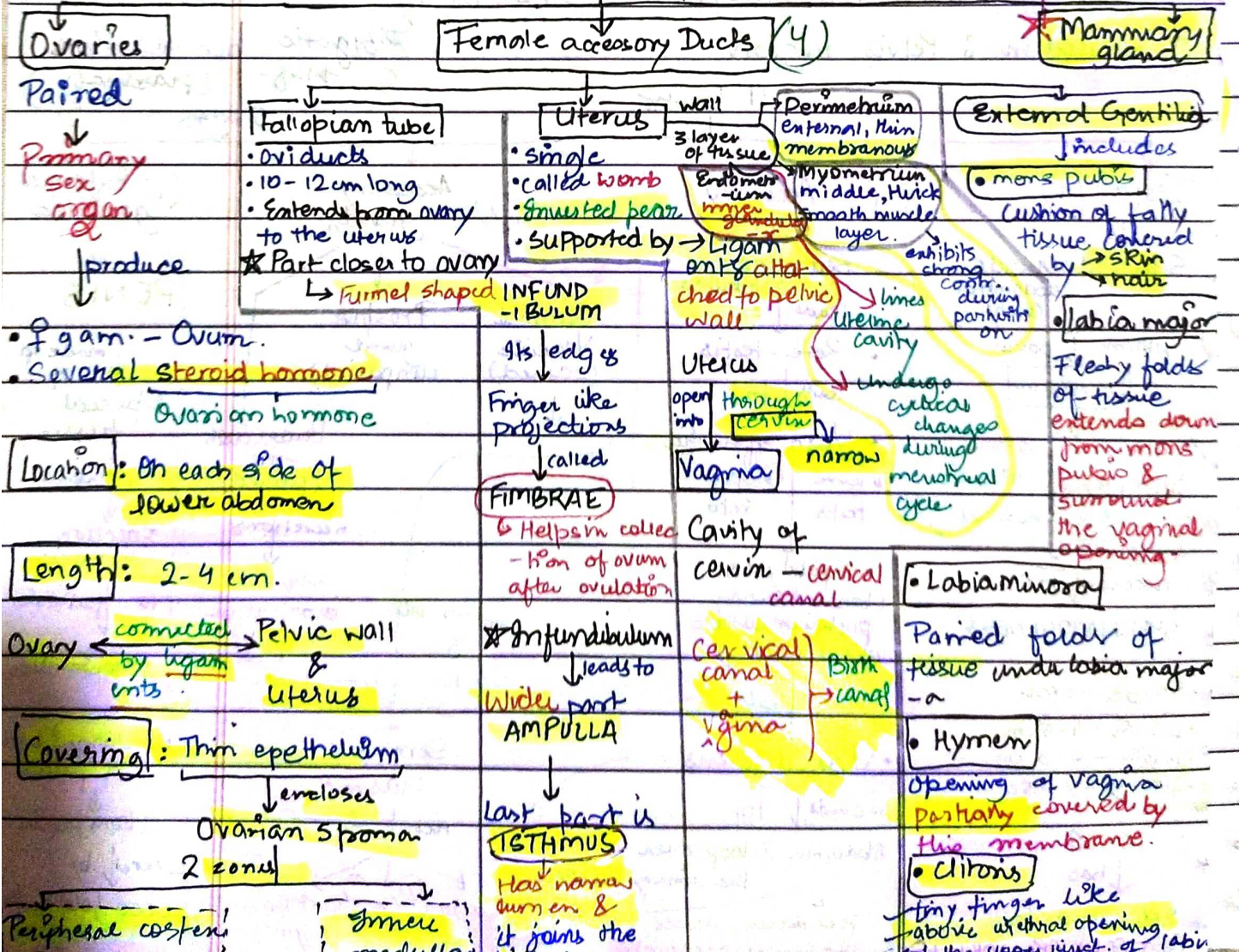


* → Ovulation, fertilization, pregnancy, birth & child care.

These parts of system along with mammary gland are integrated to support

FEMALE REPRODUCTIVE SYSTEM

consists



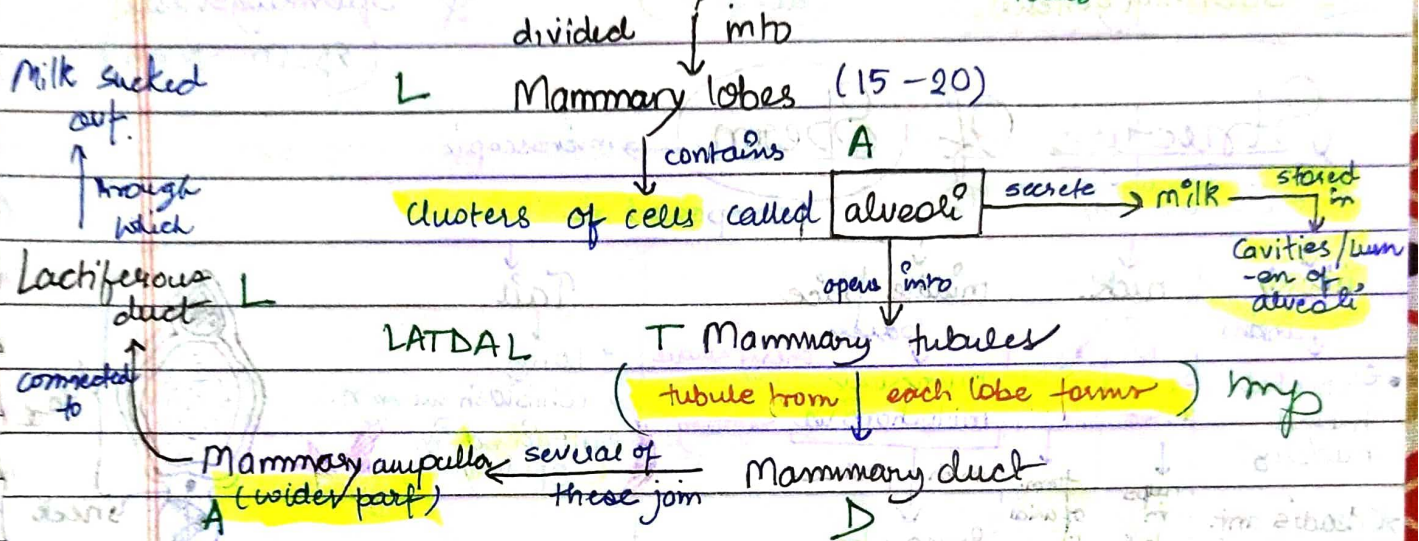
often formed, during 1st coitus (intercourse).
 However it can be broken when \rightarrow sudden fall or jolt
 \rightarrow insertion of vaginal tampon
 \rightarrow active participation in sports like horse back riding, cycling

In fact, in some human hymen may persist even after coitus.
 "Hymen - presence or absence - not a reliable indicator"

MAMMARY GLANDS \rightarrow paired

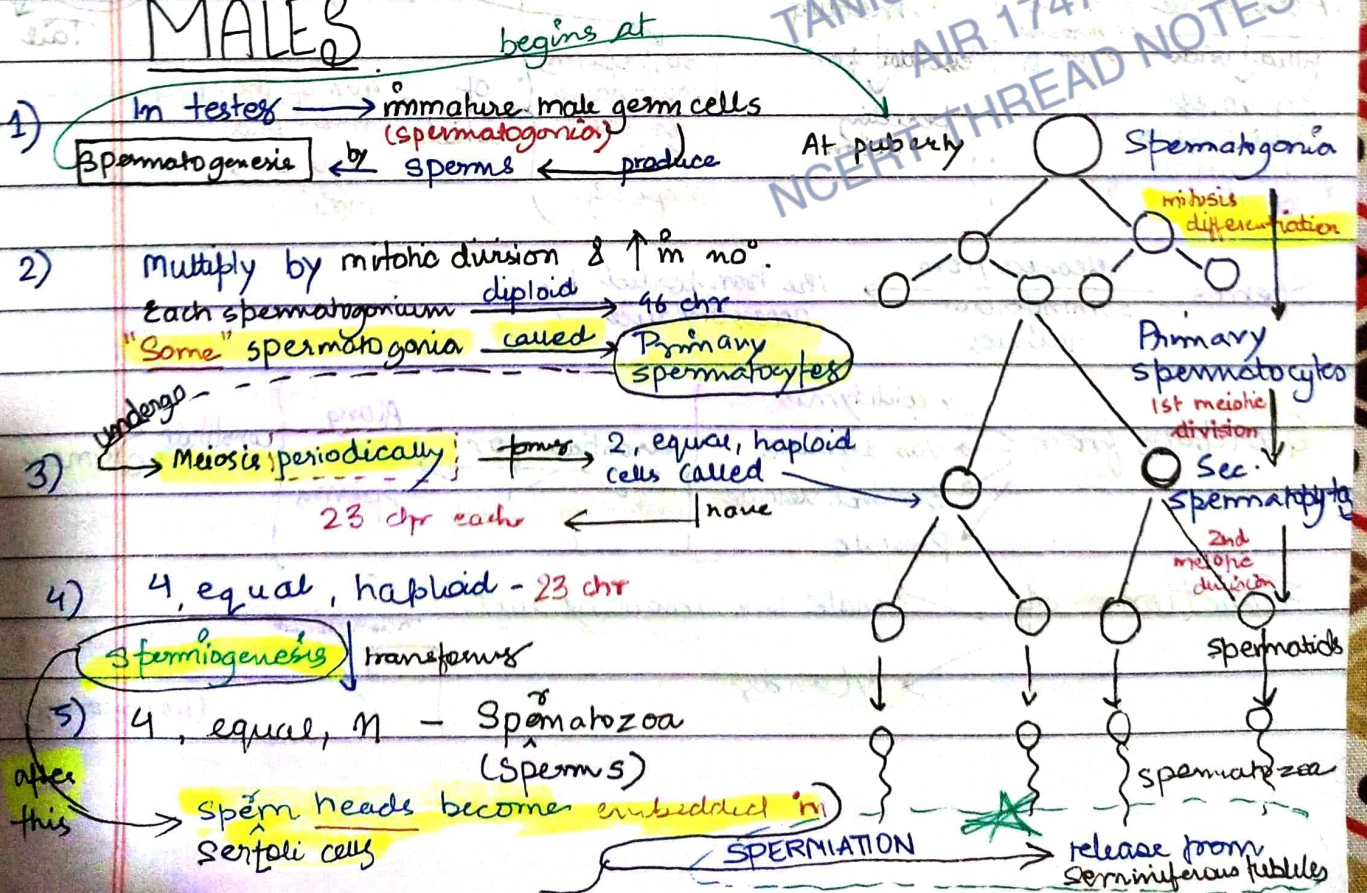
characteristic of
All Female mammals

containing \rightarrow Glandular tissue
 Variable amt of fat
 Focus



GAMETOGENESIS \rightarrow Process of form. of ♀ & ♂ gamete.

MALES



Spermatogenesis starts at Age of puberty due to sig secretion of GnRH

stimulates ant. pituitary to secrete 2 gonadotropins

Luteinising Hormone (LH)

acts on

Leydig cells

stimulates

synthesis & secretion of ANDROGENS

in turn stimulates

Spermatogenesis

(also L)

(FSH) Follicle Stimulating hormone

acts on

Sertoli cells

stimulates

secretion of some factors

help in

Spermiogenesis (spermatozoa)

Structure Of Sperm

microscopic

plasma membrane envelopes the whole body.

composed of

Head

contains

• Elongated haploid nucleus

* Head's ant. portion covered by

Cap like structure

Akrosome

filled with enzymes that help in fertilization of ovum.

neck

Proximal centriole

helps in

formation of axial filament

ent

action

helps in

formation of axial filament

ent

action

helps in

formation of axial filament

ent

action

middle piece

passes

Numerous mitochondria

which produce

Energy for movement of

tail

facilitate

Sperm motility

essential for

fertilization

Tail

long

whiplash movem.

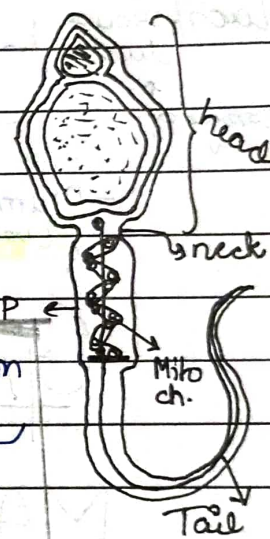
attained in epididymis

Human male ejaculates 200 million sperms

For normal fertility

60% sperms must have normal shape size

40% of them must show vigorous motility



Sperms released from seminiferous tubules are transported by accessory duct

Secretions from epididymis, vas deferens, seminal vesicle, prostate essential for maturation & motility of sperm. Along with sperm constitute Semen

Functions of male sex accessory ducts & glands maintained by Androgens (hormones)

FEMALE → Oogenesis process of form. of mature female gamete. initiated during Embryonic Development stage

A couple of million gamete mother cells (oogonia) are formed within each fetal ovary.

* No more oogonia are formed and added after birth.

These cells start division enter into Prophase - I of meiotic division

then Get arrested temporarily at Primary Oocyte stage

Each primary oocyte gets surrounded by Layer of Granulosa cells called Primary follicle

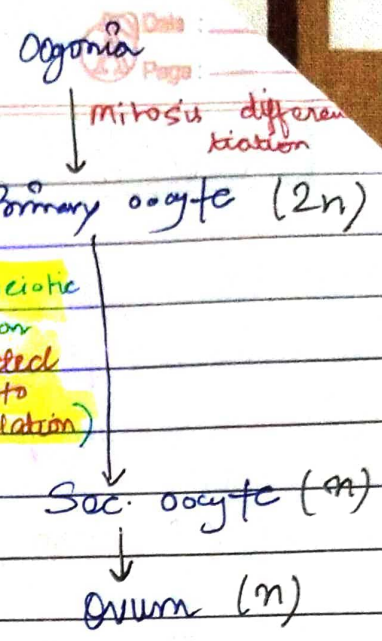
* Large no. of these follicles degenerate during the phase from birth to puberty only 60,000 - 80,000 primary follicles left in each ovary.

(1) Primary follicles get surrounded by more layers of granulosa cells & a new theca (2) Secondary follicles

(1) Fluid filled cavity called ANTRUM.
 (2) Theca layers into theca interna (inner) & theca externa (outer)
 (3) tertiary follicles transform into

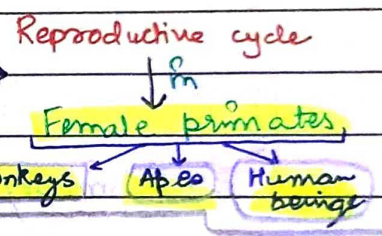
At this stage Primary oocyte grows in size results in complete 1st meiotic division
 (n) Secondary oocyte + Tiny 1st Polar body Fate of it is not known.
 retains bulk of nutrient rich cytoplasm. of Primary oocyte

(4) Graafian Follicle further changes to releases, releasing Ovulation Sec. Oocyte OR OVUM
 Sec. oocyte within forms Zona pellucida



induced by changes in pituitary hormones
ovarian

Menstrual Cycle



First menstruation begins at Puberty

Called Menarche

In human female repeat at an avg interval of 28/29 days

Events starting from One menstruation till next one

Menstrual cycle

One ovum released in Middle of each menstrual cycle.

Menstruation	Follicular phase (Proliferative phase)	Ovulation (Ovulatory phase)	Luteal phase (Secretory phase)
<ul style="list-style-type: none"> Duration: 3-5 days Menstrual flow occurs due to Breakdown of endometrial lining of uterus. + B.V present forming liquid come out through vagina This phase occurs when ovum not fertilized but can also be occur due to stress Poor health 	<ul style="list-style-type: none"> Primary follicle grow to Fully mature Graafian follicle. * Endometrium regenerates through proliferation. These changes induced in ovary uterus by changes in level of pituitary hormone ovarian hormone. Gonadotropins level ↑ LH FSH stimulates Follicular development Secretion of Estrogen by growing follicles 	<ul style="list-style-type: none"> LH, FSH → attain peak at 14th day LH surge induce ovulation Implantation necessary for other events of pregnancy 	<ul style="list-style-type: none"> Remaining parts of Graafian follicle changes to Corpus luteum secrete Large amt of progesterone essential for Maintenance of endometrium

if pregnancy → All events of menstrual cycle stop & there's no menstruation.

In absence of fertilization → C.L degenerate causes disintegration of endometrium

Menopause

(marking a new cycle) menstruation leading to

menstrual cycle ceases at → 50 yrs age.

Glyco mensturation → indicators of normal reproductive phase
Menarche & menopause → extends b/w

FERTILISATION & IMPLANTATION

During copulation (coitus)

Semen released by penis into vagina (Insemination)

Fertilization occurs

process of

ovum should also be present here simultaneously

Ampullary region of Fallopian tube

trially reach

Motile sperm swim rapidly

pass through cervix

Reach uterus

main condition

Fusion of sperm with an ovum.

During fertilization

Sperm comes in contact with Zona pellucida

Induces

Changes in membrane

which

* Secretion of acrosome

help the sperm

To enter cytoplasm of ovum

through

Ensures only one ovum fertilized by only one sperm

Blocks the entry of additional sperm

①

Zona pellucida

②

Plasma membrane

this induces

Completion of meiotic division of sec. oocyte

sperm + ova

Zygote.

(n) ovum / oohd

2nd polar body

results in

Second meiotic division of oocyte is unequal

* Father determines the sex of child, not mother.

* Mitotic division starts

at

Zygote moves through

isthmus of oviduct.

towards uterus

cleavage

called

forms 2, 4, 8, 16 cells

daughter cells

called Blastomeres

* Embryo with 8 to 16 blastomeres

is called

MORULA

continues to divide & transforms to

as it moves further to uterus.

BLASTOCYST

* Blastocyst

rearranged

Blastomeres

arranged in

Trophoblast → outer layer attached to inner cell mass → inner group of cells

Trophoblast layer attaches to Endometrium

to after attachment

Uterine cell divide rapidly

Blastocyst

becomes

Embedded in Endometrium

Implantation

PREGNANCY & Embryonic Development

After implantation

finger like projection appear on trophoblast

called

Chorionic Villi

surrounded by

uterine tissue

maternal blood

Structural unit
Functional unit
jointly forms

becomes interdigitated with each other

Fetus
Male
male body

PLACENTA

facilitates

supply of O_2 nutrients

to embryo

Removal of CO_2 energy waste materials

from embryo

transporting of subst. to & from the embryo.

help in

Embryo

through umbilical cord

2A+IV
oxyg. blood
decomp. blood

by ovary

not placenta

hCG

Human chorionic Gonadotropin

hPL

Human Placental Lactogen

Estrogen

Progesterone

Relaxin

secreted in later phase of pregnancy

secreted in women only during pregnancy

Fetal growth

in maternal blood

Other hormones that increase several fold

Metabolic changes in mother

Maintenance of pregnancy

Estrogen

Progesterone

Cortisol

Thyroxine

Prolactin

Immediately after implantation

inner cell mass (Embryo) differentiates

Inner cell mass

has

Stem cells

which have potency to give rise to

All tissue & organs

All tissue organs

these 3 give rise to

Ectoderm

outer layer

Mesoderm

Soon appears in b/w.

Endoderm

inner layer

- Human pregnancy lasts → 9 months
- Dogs → 58 days
- Cats → 58 days
- Elephants → 22 months

* After 1 month → embryo heart formed

* First sign of growth → by listening to heart sound by stethoscope.

* 2 month → limbs & digits develop

* 3 month (1st trimester) (End) (12 weeks) → Most major organs formed

limbs

Internal genitalia well developed

* 5th month → First movement of foetus

Appearance of head hair

* End of 2nd trimester (24 weeks) → Body covered with fine hairs

Eye lids separate

Eye lashes formed

TANISHA SACHAN

PARTURITION & LACTATION

AIR 1747

NCERT THREAD NOTES

Vigorous contraction of uterus causes → expulsion / delivery of baby.

Parturition → delivery of foetus.

Induced by → complex Neuroendocrine Mechanism

Signals originate from → fully developed foetus & placenta → induce mild uterine contraction

Foetal Ejection Reflex → called

* Stimulatory reflex b/w uterus & oxytocin secretion

triggers the release of Oxytocin (from maternal pituitary)

Oxytocin acts on Uterine muscle & cause stronger contraction

continues resulting in Stronger contraction

leads to → Expulsion of baby through birth canal.

* Placenta, is also expelled, soon after.

Mammary Glands $\xrightarrow{\text{undergo}}$ **differentiation** during pregnancy
starts producing milk (towards end of pregnancy)
this process \leftarrow **Lactation** \rightarrow helps mother in feeding the baby

Milk produced during initial days of lactation \rightarrow **Colostrum**
 \downarrow contains several antibodies
 \leftarrow absolutely essential for To develop resistance for new born babies

Breast feeding $\xrightarrow{\text{during}}$ initial period of infant growth
 \leftarrow recommended by doctors \leftarrow
 \rightarrow for healthy baby

* Ovarian follicles in different stages of development

\downarrow
embedded in stroma

* Male external Genitalia $\xrightarrow{\text{called}}$ penis

* Fertilization \rightarrow ampullary-isthmic junction